AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings of claims in the application:

1. (Original): In an optical fiber communications system including a transmitter node coupled to a receiver node by an optical fiber, a method for synchronizing the receiver node with the transmitter node, the method comprising:

at the transmitter node:

generating a reference signal;

synchronizing the transmitter node with the reference signal;

modulating the reference signal onto an optical signal; and

transmitting the optical signal across the optical fiber to the receiver node; and

at the receiver node:

receiving the optical signal;

recovering the reference signal from the optical signal; and

synchronizing the receiver node with the recovered reference signal.

2. (Original): The method of claim 1 wherein:

each of the transmitter node and the receiver node includes a local oscillator;

the step of synchronizing the transmitter node with the reference signal comprises

synchronizing a local oscillator at the transmitter node with the reference signal; and

the step of synchronizing the receiver node with the recovered reference signal comprises

synchronizing a local oscillator at the receiver node with the recovered reference signal.

3. (Original): The method of claim 1 wherein:

the step of modulating the reference signal onto an optical signal comprises:

generating a harmonic of the reference signal; and

modulating the harmonic onto the optical signal; and

the step of recovering the reference signal from the optical signal comprises:

recovering the harmonic from the optical signal; and

frequency dividing the harmonic to recover the reference signal.

4. (Original): The method of claim 1 wherein:

the step of modulating the reference signal onto an optical signal comprises:

frequency division multiplexing the reference signal with a plurality of electrical low-speed channels to form an electrical high-speed channel; and

converting the electrical high-speed channel from electrical to optical form to form the optical signal; and

the step of recovering the reference signal from the optical signal comprises:

converting the optical signal from optical to electrical form to recover the electrical high-speed channel; and

frequency division demultiplexing the reference signal from the electrical high-speed channel.

5. (Original): The method of claim 4 wherein, in the electrical high-speed channel, the reference signal is located at a frequency lower than that of the electrical low-speed channels.

6. (Original): An optical fiber communications system for transmitting at least two low-speed channels across the communications system, the communications system comprising:

a transmitter node including:

a local oscillator for generating a reference signal; and

an FDM multiplexer coupled to the local oscillator for combining the low-speed channels with the reference signal into an electrical high-speed channel; and

a receiver node coupled to the transmitter node by an optical fiber, the receiver node including:

an FDM demultiplexer for recovering the reference signal from the electrical high-speed channel;

a local oscillator; and

electronics coupled to the local oscillator and the FDM demultiplexer for synchronizing the local oscillator with the recovered reference signal.

7. (New): The optical fiber communications system of claim 6 wherein:

the transmitter node further includes:

electronics coupled between the local oscillator and the FDM multiplexer for generating a pilot tone from a harmonic of the reference signal, wherein the FDM multiplexer combines the low-speed channels with the pilot tone into an electrical high-speed channel; and

an E/O converter coupled to the FDM multiplexer for converting the electrical high-speed channel into an optical high-speed channel; and

the receiver node further includes:

an O/E converter coupled to the FDM demultiplexer for receiving the optical high-speed channel and converting it to the electrical high-speed channel;

wherein the FDM demultiplexer recovers the pilot tone from the electrical high-speed channel and the electronics in the receiver node recover the reference signal from the pilot tone.

8. (New): The optical fiber communications system of claim 7 wherein, in the electrical high-speed channel, the pilot tone is located at a frequency lower than that of the electrical low-speed channels.

9. (New): The optical fiber communications system of claim 7 wherein each of the electrical low-speed channels and the pilot tone is allocated a different frequency band within the electrical high-speed channel and within the optical high-speed channel.

10. (New): The method of claim 1 wherein:

each of the transmitter node and the receiver node includes a local oscillator;

the step of synchronizing the transmitter node with the reference signal comprises locking a local oscillator used in the transmitter node to the reference signal; and

the step of synchronizing the receiver node with the recovered reference signal comprises locking a local oscillator used in the receiver node to the recovered reference signal.

11. (New): The method of claim 10 wherein:

the step of modulating the reference signal onto an optical signal comprises:

generating a harmonic of the reference signal; and

modulating the harmonic onto the optical signal; and

the step of recovering the reference signal from the optical signal comprises:

recovering the harmonic from the optical signal; and

frequency dividing the harmonic to recover the reference signal.

12. (New): The method of claim 11 wherein:

the substep of modulating the harmonic onto an optical signal comprises:

frequency division multiplexing the harmonic with a plurality of electrical low-speed channels to form an electrical high-speed channel; and

converting the electrical high-speed channel from electrical to optical form to form the optical signal; and

the substep of recovering the harmonic from the optical signal comprises:

converting the optical signal from optical to electrical form to recover the electrical high-speed channel; and

frequency division demultiplexing the harmonic from the electrical high-speed channel.

13. (New): The method of claim 12 wherein, in the electrical high-speed channel, the harmonic is located at a frequency lower than that of the electrical low-speed channels.

14. (New) The method of claim 12 wherein each of the electrical low-speed channels and the harmonic is allocated a different frequency band within the electrical high-speed channel and within the optical signal.

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